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ABSTRACT

The purpose of this study was to identify which instructional models based on the framework of Joyce, Weil, and Showers, could be used effectively in distance education over the Interactive Video Network (IVN) system in North Dakota. Instructional models have been organized into families such as Information Processing, Social, Personal, and Behavioral systems. Each family contains several different instructional models with similar assumptions leading to similar outcomes. Models may involve techniques like advance organizers, analogies, memorization, simulation, and role playing. Subjects were 126 students enrolled in selected IVN distance education courses at North Dakota State University during 1993-1994 and 1994-1995 academic years and the summer 1995 session. These included students enrolled in graduate courses offered by the School of Education, and one undergraduate/graduate course offered by the College of Business. A survey was administered to students at both on-campus and off-campus sites to measure the most effective and preferred of the instructional models. Results indicated that the six highest ranking instructional models (representing three of the families of instructional models) most effectively utilized over a distance delivery system are: role playing; simulation; jurisprudential; memorization; synectics; and inquiry. Students perceived direct instruction to be the least effective instructional model. They preferred models that actively engage them as learners both physically and mentally. Recommendations for future research include: examine the relationship between the discipline and the instructional models favored; evaluate and revise the distance education handbook to include specific ideas from IVN instructors; and evaluate the instructional models currently being used. A table provides a rank order to effective instructional models using IVN distance education. (Contains 11 references.) (AEF)

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Instructional Models Effective in Distance Education

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Abstract

Learning is a complex process in traditional classrooms but in a distance education classroom it becomes even more complicated. This study examines the instructional models that can be used effectively over one type of a distance education system. Results indicate that both undergraduate and graduate students prefer models that actively engage them as learners both physically and mentally. Recommendations for future research are proposed.

Instructional Models Effective in Distance Education

Learning is a complex process involving interactions among instructor, student, content, and the instructional environment (Keefe, 1987). In a traditional classroom setting, instructors accommodate and adapt to student needs, content needs, and environmental needs using a variety of instructional models. Distance educators have become increasingly familiar with the technology available to design and create effective learning environments. As technology becomes a major player in instructional design, it is imperative that instructional models providing effective instruction be identified.

Instructional models have been organized into families: social, information processing, personal, and behavioral systems (Joyce, Weil, and Showers (1992). Each family contains several different instructional models with similar assumptions leading to similar outcomes. A brief description of each family and its' instructional models follows.

The Information Processing Family instructional models refer to the way students organize and acquire data, sense problems, generate concepts and solutions, employ verbal and non-verbal skills, and develop concepts. The models emphasize creative thinking, concept formation, and hypothesis testing. Instructional models included in this family are: concept attainment, advance organizer, memorization, inquiry, synectics, and the inductive approach (Joyce, Weil, and Showers, 1992).

In the advance organizer model, a teacher presents material in a clear precise order, with numerous examples related to students' prior knowledge. At the end of the lesson, students summarize the lesson and/or provide new examples or relationships (Joyce, Weil, and Showers, 1992; Kauchak and Eggen, 1993; Eby and Kujawa, 1994; Orlich et al., 1994).

In concept attainment, instructors provide students with examples and non-examples of a concept. Additional examples and non-examples of the concept are given and the student is asked to identify common characteristics. Additional examples are provided and students are asked to hypothesize about the concept. Once students identify the concept, additional examples and non-examples of the concept are developed (Joyce, Weil, and Showers, 1992; Kauchak and Eggen, 1993; Orlich et al., 1994).

Students attempt to solve puzzling problems in an inquiry model. The students collect and verify data, develop concepts/hypotheses, test concepts or hypotheses, and draw conclusions under the supervision of a teacher. Students are challenged to think about what is happening at all times, by each other and the instructor (Joyce, Weil, and Showers, 1992; Orlich et al., 1994).

The synectics model is used to enhance the students' creative thinking processes by using analogies to make the unfamiliar familiar. The teacher guides students through this model by asking a series of questions. The interactions between teacher and student throughout this model allow for discussions of similarities and differences between the original idea and the analogy. A better understanding of the original concept results along with an expansion of the creative thinking process (Joyce, Weil, and Showers, 1992).

Memorization techniques assist students in remembering facts, data, and/or information. Many different techniques, including key-word, substitute-word, link-work, ridiculous association and exaggeration are all effective in enabling student learning. Mnemonic devices students develop themselves, have been found to be the most effective in retention of knowledge (Joyce, Weil, and Showers, 1992; Kauchak and Eggen, 1993).

Teachers using an inductive model present students with a general idea to investigate and are allowed to structure a problem they would like to pursue within some basic parameters. Students identify critical data to gather, interpret data, identify relationships and/or apply principles to explain new phenomena. During the model, the instructor uses a variety of questions to assist students (Joyce, Weil, and Showers, 1992; Kauchak and Eggen, 1993; Orlich et al., 1994).

The Behavioral Family instructional models emphasize changing the visible behavior of the learner rather than a learner's psychological structure or unobservable behavior. A basic assumption of all behavioral family models is that human beings are self correcting communication systems and will modify behavior in response to previous behavior. Some of the instructional models in this family are mastery learning, direct instruction, and simulations (Joyce, Weil, and Showers, 1992).

The simulation model is a duplication of actual problems, events, or situations where the risk of injury to students is eliminated. The simulation is designed to mirror an actual event as closely as possible and involve students actively. Simulations can involve both physical skill and social interaction simulations (Joyce, Weil, and Showers, 1992; Orlich et al., 1994).

In direct instruction, material is presented in small, sequenced segments. Connections are explicitly made for students and time is allocated for practice and feedback from the instructor. Constant review of previous learning is a part of this model as well as feedback and practice (Joyce, Weil, and Showers, 1992; Eby and Kujawa, 1994; Orlich et al., 1994).

The Social Family instructional models emphasize the relationships of individuals to society and to other people. The instructional models in this family are designed to take advantage of the collective energy that occurs

when learning communities are built within a classroom. Some of the instructional models in this family are: cooperative learning groups, role playing, jurisprudential, and conceptual systems (Joyce, Weil, and Showers, 1992).

The role playing model is used when an instructor wants to immerse students in an active learning situation. A problem or event to which students can easily relate is identified, roles are assigned to selected students, and the remaining class members are active observers of the role play event and given instructions on who and what to observe. Role playing is most effective when a structured discussion follows the role playing event. The discussion many times results in further re-enactments of the situation and continued discussions about the event (Shaftel and Shaftel, 1982; Joyce, Weil, and Showers, 1992; Eby and Kujawa, 1994; Orlich et al., 1994).

Cooperative learning provides an opportunity for students to structure their own learning within a team setting. Groups can contain as few as two people or as many as four to six people. Each group member is responsible for ensuring that all group members understand and learn the material. This responsibility is something that teachers must spend some time explaining to students when this instructional model is first introduced to students. Within this model are numerous techniques an instructor can select to use in a classroom. The technique selected is based on content and intended student outcomes (Joyce, Weil, and Showers, 1992; Kauchak and Eggen, 1993; Eby and Kujawa, 1994; Johnson and Johnson, 1994; Orlich et al., 1994).

The jurisprudential model involves the instructor and students in Socratic dialogue. The instructor presents material which students use to form public policy issues. The students take a position on the policy issue and gather evidence to support their point of view. During this process, the

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instructor questions students to enhance their critical thinking skills and must be skilled in questioning techniques (Joyce, Weil, and Showers, 1992).

Conceptual systems is a framework for thinking about how individual students learn. The theory describes human development in terms of increasingly complex systems for processing information about people, things, and events and was developed by David Hunt and associates. In order for the information processing systems to be effective, appropriately complex learning environments must be designed. It is not a specific instructional model but rather a way to structure information for student comprehension (Joyce, Weil, and Showers, 1992).

The Personal Family instructional models focus on an orientation to self and self development. The main goal of these instructional models is to help students develop productive relationships with their environments and view themselves as capable persons. Concepts of self and nondirective teaching are two of the instructional models in this family. Both of these models rely heavily on one-to-one interaction and are based on counseling models (Joyce, Weil, and Showers, 1992).

All of these instructional models have been found to be effective in traditional classroom. Teachers are encouraged to implement a variety of these instructional models to better address all student learning styles (Joyce, Weil, and Showers, 1992).

Distance education via the Interactive Video Network (IVN), simultaneous two-way audio visual interaction, brings an additional set of issues to be considered by the instructor and effective models for this delivery system need to be identified. The distance education system being used in North Dakota at this time is a two-way interactive telecommunications system located at many sites throughout the state. Any combination of two to fourteen sites

may be connected together for a single event and several events may occur at the same time. IVN students can hear all sites at all times but can only see up to four other sites at one time. The network automatically switches the video to the site that is currently speaking. For the automatic switching to occur, a sound must last about two seconds. IVN uses a compressed digital video format. The picture is very high quality but is not quite as well defined as network television. Instructors are given some training prior to their first teaching opportunity on the system but the training is limited to information that is specific to the system, not the variety of instructional models available for use on the system. Rather, information regarding a traditional format - i.e. lecture - is presented. The focus of the training is on learning the operation of the equipment and system (Teacher Training Workshop Manual 1993; 1994; 1995).

Active learning models were found to be effective in distance education with adult students (Jackman & Swan, 1995). Graduate students indicated a preference for the role playing, simulation, jurisprudential, and memorization models. All four of these models represent strategies that allow students to be active both physically and mentally in the learning process. In order for these models to be used in distance education, minor modifications were made to each instructional model.

Purpose

The purpose of this study was to identify the instructional models, based on the framework of Joyce, Weil, & Showers (1992), that can be used effectively in distance education over the IVN system in North Dakota.

The objectives of this study were reflected in the following research questions:

1. What instructional models are preferred by students both on-campus and off-campus?
2. What instructional models are effective when used in distance education?

Methodology

Students enrolled in selected IVN courses at North Dakota State University during the 1993-1994 and 1994-1995 academic years and the summer of 1995 served as the sample for this study. This included students enrolled in graduate courses offered by the School of Education and one undergraduate/graduate course offered by the College of Business.

The effectiveness of the instructional models proposed by Joyce, Weil and Showers (1992), for use in the IVN system in North Dakota, was determined using a survey instrument developed by the researchers. This survey instrument was designed using a 5 point Likert scale and pilot tested with IVN instructors and students at North Dakota State University during the Summer of 1993. Minor modifications were made to the survey instrument following the pilot test. The Cronbach Coefficient Alpha test was used to determine reliability of the appropriate sections of the instrument r=.84. The alpha level for all statistical testing in this study was set at the .05 level. The items in the survey instrument were related to instructional models, the IVN system in general, and demographics.

After securing permission from the instructor responsible for the class, the survey instrument was administered to students at both on-campus and off-campus sites. Data were analyzed using appropriate statistical analysis. Statistical analysis programs designed for the microcomputer were utilized.

Findings

The study included 126 students enrolled in IVN distance education courses during 1993-1994 and 1994-1995 academic years and the summer 1995 session at North Dakota State University. The study participants were divided into two groups by location of attending the courses, on-campus and off-campus. The on-campus students, N=99, were those students enrolled in the courses and attending class at the site where the instructor was teaching. The off-campus students, N=27, were those students enrolled in the courses and attending at a distance location external from the campus. This group viewed the instructor on a television screen. Demographic data was collected from each group to identify characteristics of the groups.

Of the on-campus students, 62.6% were identified as female and 37.4% male, ranged in age from 20 - 59 years, 69.7% had received a BA/BS degree, and 55.6% were married while 34.4% were not married. The off-campus students were 48.1% female and 51.9% male, ranged from 20 - 49 years of age, 51.9% had received BA/BS degrees, and 53.9% were married while 40.7% were not married.

Objective one was to determine which instructional models were preferred by students enrolled in IVN courses. An analysis using t-test comparisons of both on-campus students and off-campus students resulted in statistically significant differences between the two group means on the instructional models preferred (Refer to Table 1). The off-campus group placed more importance on the memorization model than did the on-campus group. The off-campus group placed more importance on the conceptual systems model than did the on-campus group. Small differences were noted on the perceived effectiveness of both the inductive approach and the cooperative learning models, but overall were not significant. Both the on-campus and off-campus groups placed high importance on active learning models as is evident from the

rank orders in the table. The off-campus group indicated a preference for the memorization model over all other models identified in the study which was a statistically significant difference.

On individual preferences, significant differences between the on-campus and off-campus students were found in six of the statements concerning overall perceptions of IVN courses. Differences were found in: "the IVN course was presented in a well-organized method, P-Value = .0027;" "the sound quality on the IVN system was adequate, P-Value = .0006;" "IVN support personnel remained in the classroom throughout the class period, P-Value = .0002;" "the information presented in class was easy to follow, P-Value = .0049;" "the camera always showed me what I wanted to see, P-Value = .0023;" " I could hear the instructor and the students in other sites, P=Value = <.0001." In all instances, the off-campus group mean scores were lower than the on-campus group.

Objective two was to determine which instructional model(s) are effective when used in distance education, IVN, settings in North Dakota. Table 1 identifies how each of the two groups ranked the effectiveness of specific instructional models identified by Joyce, Weil and Showers (1992). Table 1 also identifies how both groups ranked, by mean scores, the individual models on their effectiveness over IVN.

The results of this study indicated that many students were familiar with and recognized the different models. As the data were examined, the researchers began to think about why students were familiar with most of the models. Several reasons must be acknowledged.

Many of the students in this study had direct connections to a graduate program in Education, where it is expected that they are aware of different instructional models. Students in other academic programs may not be as

familiar with the names of the different instructional models. Education students, at both the graduate and undergraduate level, are encouraged to actively involve their students in the learning process. This emphasis requires a knowledge of a variety of instructional models, including several active learning models. For this reason, it is with caution that we interpret the results and generalize to the entire IVN student population.

Conclusions

The following conclusions are based on the findings of this study and can be generalized only to similar groups in similar situations. The six highest ranking instructional models most effectively utilized over a distance delivery system are: a) Role Playing, b) Simulation, c) Jurisprudential, d) Memorization, e) Synectics; and f) Inquiry. These six models represent three of the families of instructional models identified by Joyce, Weil and Showers (1992). It is recommended that all of these models continue to be incorporated into the teaching of courses over a distance education system, IVN. It was perceived by students that direct instruction was the least effective instructional model and should be utilized to a limited extent if at all.

Students preferred to be active in the learning process and identified the models which placed them in an active learning situation. This is important since many traditional courses do not use active learning models as an integral part of the curriculum. It is recommended that instructors examine the models used in their classrooms and incorporate additional active learning models to their teaching repertoire.

Suggestions For Further Research

As this study progressed, the researchers began to think of numerous studies that would build on this study and provide a more complete picture of

distance education in North Dakota. Ideas for additional research involving other aspects are listed below.

* Replicate this study with students from all campuses in North Dakota enrolled in IVN courses.
* Examine the relationship between the discipline and the instructional models favored.
* Evaluate and revise the distance education handbook developed to include specific ideas from IVN instructors who have used various instructional models.
* Evaluate the instructional models currently being used by IVN instructors for delivery in distance education settings.

References

Eby, J. W. & Kujawa, E. (1994). Reflective planning, teaching, and evaluation: K-12. New York: Merrill, an imprint of Macmillan Publishing Company.

Jackman, D. H. & Swan, M. K. (1994). Alternative Instructional Models for IVN Delivery (Volume 1). Fargo: North Dakota State University, Central Duplicating.

Johnson, D. W. & Johnson, F. P. (1994). Joining together - group theory and group skills. Boston: Allyn and Bacon.

Joyce, B., Weil, M. & Showers, B. (1992). Models of Teaching. Boston: Allyn and Bacon.

Kauchak, D. P. & Eggen, P. D. (1993). Learning and teaching: Research based methods (2nd ed.). Boston: Allyn and Bacon.

Keefe, J. (1987). Learning style: Theory and practice. Virginia: National Association of Secondary School Principals.

Orlich, D. C., Harder, R. J., Callahan, R. C., Kauchak, D. P. & Gibson, H. W. (1994). Teaching strategies: A guide to better instruction (4th ed.). Lexington, MA: D. C. Heath and Co.

Shaftel, F. R. & Shaftel, G. (1982). Role playing in the curriculum (2nd ed.). Englewood Cliffs, NJ: Prentice Hall, Inc.

Teacher training workshop manual. (1993). North Dakota Interactive Video Network.

Teacher training workshop manual. (1994). North Dakota Interactive Video Network.

Teacher training workshop manual. (1995). North Dakota Interactive Video Network.

Table 1

Rank Order of Effective Instructional Models Using Distance Education, IVN

Model	On-Campus		Off-Campus		All Groups	
	Mean	Rank	Mean	Rank	Mean	Rank
Role Playing	2.98	1	3.00	4	2.98	1
Simulation	2.82	2	2.99	5	2.85	2
Jurisprudential	2.74	3	2.97	6	2.79	3
Memorization	2.63	4	3.30	2	2.78	4
Synectics	2.63	5	2.91	8	2.73	5
Inquiry	2.61	6	3.00	3	2.70	6
Inductive Approach	2.55	8	3.01	1	2.65	7
Cooperative Learning	2.56	7	2.91	9	2.63	8
Concept Attainment	2.50	9	2.87	10	2.58	9
Conceptual Systems	2.43	11	2.97	7	2.55	10
Advance Organizers	2.47	10	2.81	11	2.54	11
Direct Instruction	2.23	12	2.52	12	2.29	12